



**Particle Physics Division  
Mechanical Department Engineering Note**

Number: MD-ENG-174

Date: 23 December 2008

Project Internal Reference:

Project: NOvA Full Height Engineering Prototype (FHEP)

Title: NOvA Full Height Engineering Prototype (FHEP) at CDF  
Layout

Author(s): Dave Pushka

Reviewer(s):

Key Words: NOvA, Assembly and Installation, Block Pivot Table

Abstract Summary:

Field measurements taken at CDF were used to create a virtual model of the northwest corner of the detector assembly pit and narrow version of the NOvA far detector block pivot table.

Applicable Codes: n/a

Reference Drawings: 2563.100-ME-339148, 2563.100-ME-339149, and 2563.100-ME-339985 (all three of these drawings are un-dimensioned and therefore, require field measurements).

Solid Model File:

PPD\_IDM\_PPD91059\DRP\_NOVA\_FHEP\_CDR\_12-2-08.MF1

Discussion:

Key dimensions taken at CDF using the group's laser distance device are:

Floor to bottom of crane:	612 inches
Floor to bottom of north walkway structural steel:	386.7 inches
Width of north walkway (cement wall to handrail):	69.5 inches
Width of wall btw column lines D and E:	285.2 inches
Width of electrical clear area at col. line D:	48 inches
Ladder cage projection east of col. Line D:	36 inches
Length of assy pit floor btw col. Lines 1 and 4:	824 inches

Images of NOvA FHEP at CDF:

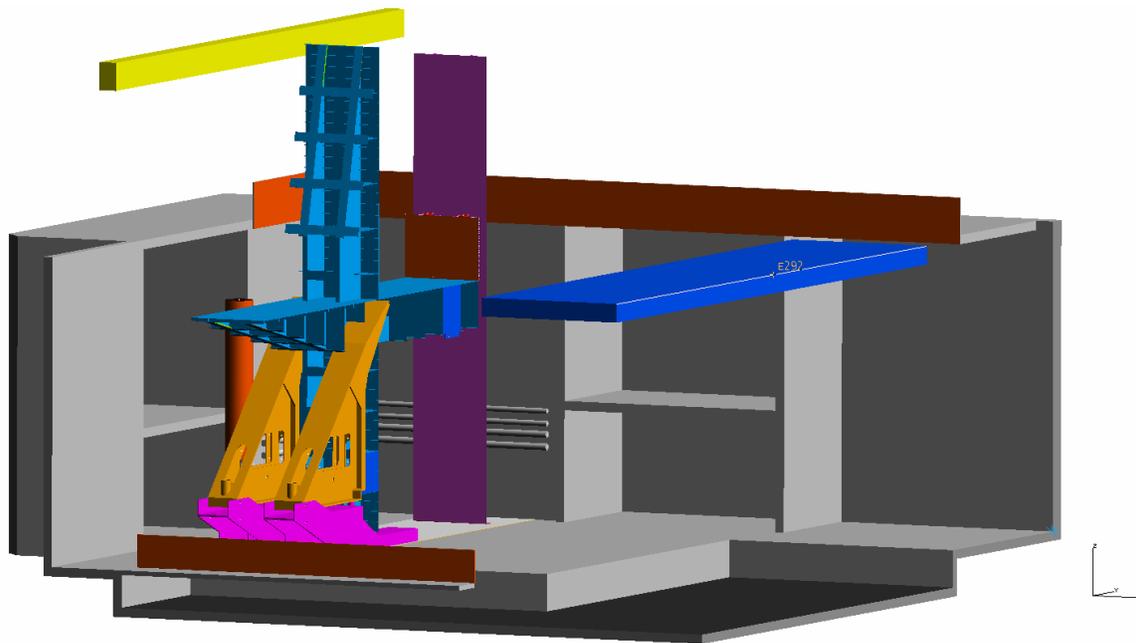


Image 1: NOvA FHEP at CDF Assembly Pit Looking to the Northwest.

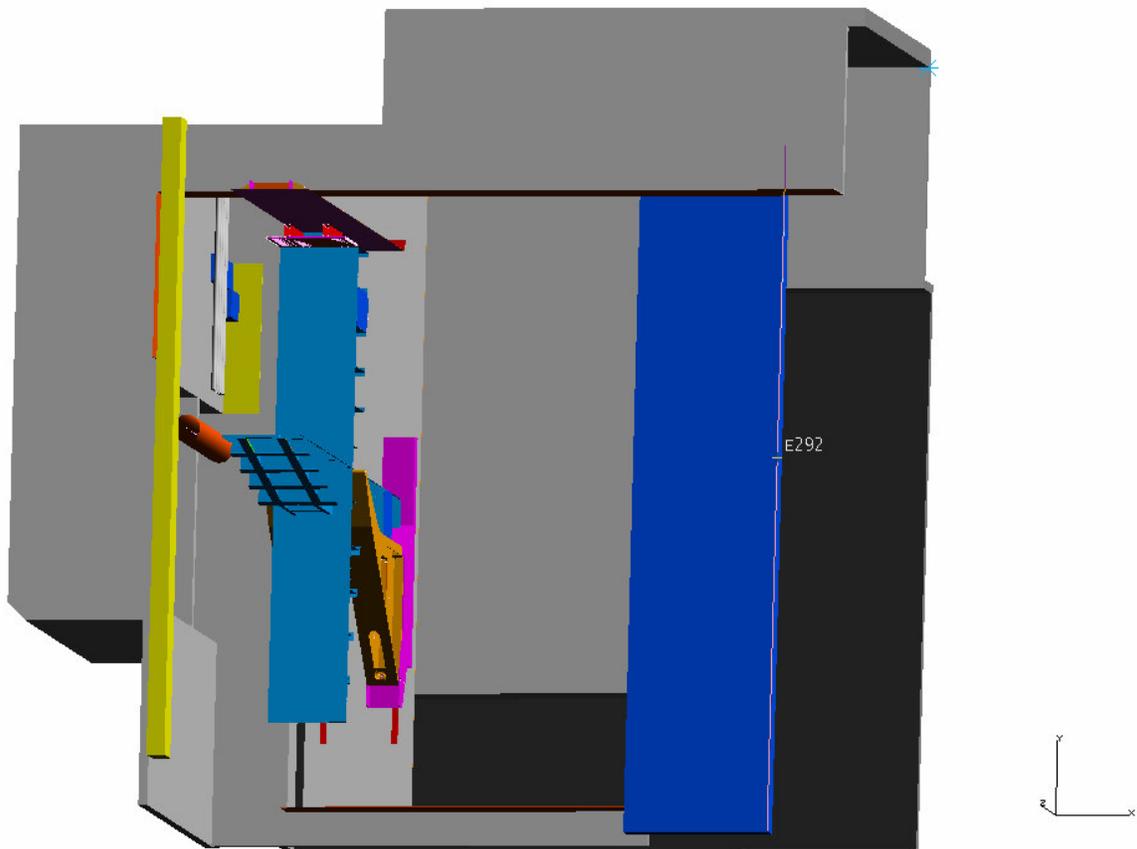


Image 2: Semi Plan View (Looking Down from Above) of the NOvA FHEP Pivoter in the CDF Detector Pit.

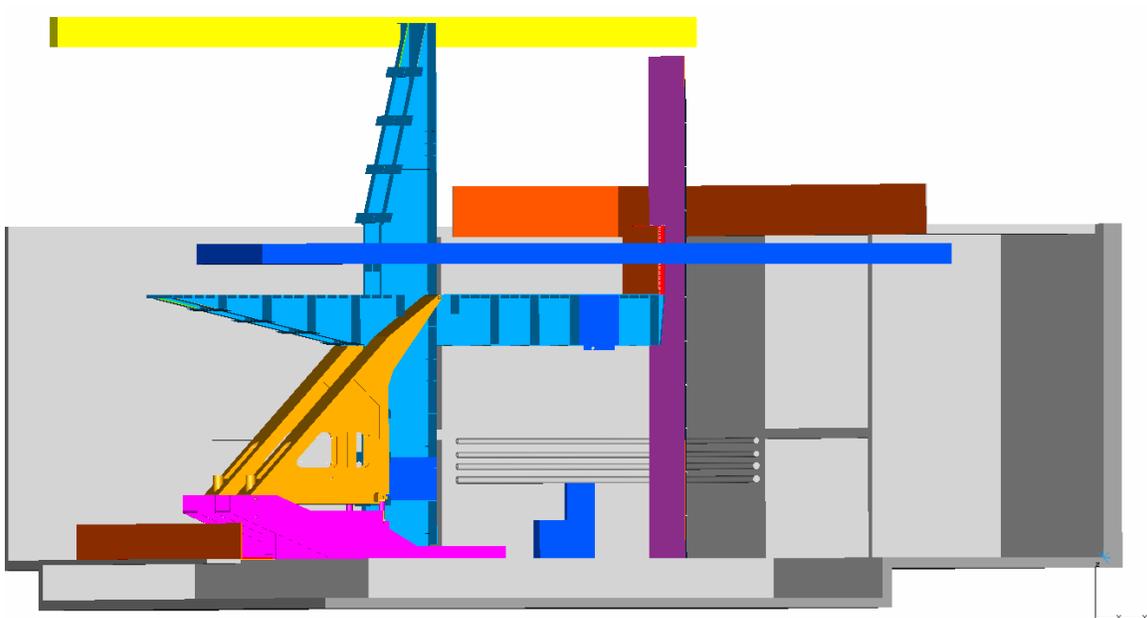


Image 3: Elevation View

Notes about the Images shown:

- 1) CDF Crane Rail is shown in Yellow. Bottom of Crane Rail is 612 inches above the assembly elevation.
- 2) CDF Transport Cart is not shown in its normal parking space.
- 3) The Pivoter shown the table in both the vertical and horizontal positions (it can only be in one position at any one time). As shown, the pivoter table will need to be shortened to avoid conflict with the crane.
- 4) The FHEP “Bookend” is shown in purple on the north wall of the assembly area.
- 5) The CDF Cable Bridge is shown as a blue rectangle. Elevation and horizontal position of the lower edge are accurate. Size is not.
- 6) Hand rails around the pit are shown as solid orange walls.
- 7) Light gray area on the floor in image 2 represents an area twelve feet wide, located 10 feet east of the west wall. Actual distance from the wall will be about 12 feet. Refer to item 4 below from the discussion with the CDF staff. This will be changed to 12 feet from the west wall in the actual installation.

Results of Discussions between CDF and NOvA staff:

Participants:

Pat Lukens, Del Allspach, Dervin Allen, Dave Pushka, Philip Schlabach, Massimo Casarsa, and Mike Lindgren.

Issues discussed include:

- 1) A need on the part of the CDF operations crew to maintain access to the equipment located in the refrigeration system alcove on the west side of the pit. As such, the pivoter will be located as far to the east as possible to allow fork truck access and room for the back-up chiller.
- 2) Shelving units presently on the floor in this area will be moved by the CDF staff.

3) Orientating the pivoter 90 degrees and locating it in the CDF transported cart area only allows 53 feet from the west wall to the lower west edge of the cable tray bridge. As such, this is shorter than the diagonal for the pivoter, pallet and detector; the full height cannot be used. So the configuration shown will be used and the detector built to 11 module widths tall (about 572 inches).

4) The CDF loading dock usage will be limited as much as possible to off loading pivoter and detector assemblies. Once off loaded, the desire will be to place the component directly in place in the assembly pit. This will minimize the affect to CDF operations and should not represent a burden to the NOvA FHEP assembly.

5) Schedule for completing this will be technically driven, until requisitions cross Pat Lukens' desk. Engineering will proceed this winter, with the intent of being able (should the cost and schedule allow) to assemble the device at CDF in the fall of 2009.